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REMARKS

Claims 1-20 and 30-36 remain pending. Claims 21-29 have been deleted, and claims 30-36 have been added.

In the Office Action, the Examiner rejected claims 1, 2, 4, 5, 7-10, 12, 13, and 16-19, 21-26, 28, and 29 under 35 U.S.C. § 102(b) as being anticipated by Neubauer et al. (US Pat. No. 6,584,138); rejected claims 6, 14, 15, and 20 under 35 U.S.C. § 103(a) as being unpatentable over Neubauer et al. in view of Boney et al. ("Digital Watermarks for Audio Signals" IEEE Conf on Multimedia Computing, June, 1996); and rejected claims 3, 11, and 27 under 35 U.S.C. § 103(a) as being unpatentable over Neubauer et al. in view of Bassini et al. (US Pat. No. 4,035,838).

Applicant respectfully traverses the § 102(b) rejection of claims 1, 2, 4, 5, 7-10, 12, 13, and 16-19 over Neubauer et al. Independent claim 1, as amended, requires a method including, *inter alia*, "removing a frequency band surrounding the carrier frequency from the audio signal." Independent claim 9, as amended, requires a system including, *inter alia*, "a notch filter to remove a frequency band surrounding the carrier frequency from the audio signal." Independent claims 7 and 18 require a method and system including, *inter alia*, "filter[ing] the enhanced acoustic transmission signal to isolate the modulated carrier signal from the masking signal and the audio signal of the enhanced acoustic transmission signal; and demodulat[ing] the modulated carrier signal to extract the data signal from the modulated carrier signal." Neubauer et al. fails to disclose all elements of the methods and systems of claims 1, 7, 9, and 14.

Claims 1 and 9:

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Pages 2 and 3 of the Office Action read the claimed generating a carrier signal on the provision of $\cos\omega_{\tau}t$ and read the claimed removing a frequency band on the col. 10, lines 50-55. This latter portion of Neubauer et al. discloses block 102 providing a frequency-varying masking threshold $W(\omega)$ to weighting means 112. Col. 10, lines 53-55, indicates that $W(\omega)$ “dictates [sic, dictates] up to which energy level on the signal energy may be applied at a location ω such that this alteration remains non-audible.”

Neither this portion of Neubauer et al. nor any other portion teaches or suggests that the value of $W(\omega)$ is zero to meet the “removing a frequency band” limitation of claim 1. Rather, the opposite implication exists: $W(\omega)$ is a maximum energy level at given frequencies so that the alternation remains non-audible. Surely such maximum masking threshold would be non-zero at all frequencies, because the operative condition is “non-audible.”

In any event, Neubauer et al. also fails to disclose “removing a frequency band surrounding the carrier frequency from the audio signal.” First, the masking threshold $W(\omega)$ fails to mention the frequency ω_{τ} of the alleged carrier signal $\cos\omega_{\tau}t$. Also, as apparent in Fig. 1 of Neubauer et al., the music signal $n(k)$ 120 is added directly to the psychoacoustically weighted signal at block 116 (col. 12, lines 43 and 44). Fig. 1 shows a direct signal path of music signal $n(k)$ 120 from the input of block 100 to block 116, so a frequency band is not removed from this direct $n(k)$ as set forth in independent claim 1. Because Neubauer et al. fails to disclose “removing a frequency band surrounding the carrier frequency from the audio signal,” the rejection of claim 1 is improper and should be withdrawn.

Regarding claim 9, in addition to the common recitations with claim 1, as amended it also

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requires a notch filter. As explained above with regard to claim 1, there is no explicit or implicit disclosure in Neubauer et al. that block 102 reasonably corresponds to a notch filter. Further, the music signal $n(k)$ 120 is plainly not notch filtered either before or after summation block 116 at the top of Fig. 1.

Because Neubauer et al. fails to disclose "a notch filter to remove a frequency band surrounding the carrier frequency from the audio signal," the rejection of claim 9 is improper and should be withdrawn. Claims 2, 4, 5, 10, 12, 13, 16, and 17 are allowable at least by virtue of their dependence from claims 1 and 9.

Claims 7 and 18:

Regarding claims 7 and 18, pages 3 and 4 of the Office Action read the claimed filtering on low-pass filter 402 and read the claimed demodulating on matched FIR filter 408 of Neubauer et al.

Claims 7 and 18 each require filter[ing] the enhanced acoustic transmission signal to isolate the modulated carrier signal from both the masking signal and the audio signal. Low-pass filter 402, by contrast, does not isolate the modulated carrier signal (i.e., $s(l)$ output from block 110 according to the interpretation of claims 1 and 9) from either the masking signal (i.e., $g(l)$ according to page 2 of the Office Action) or the audio signal (i.e., music signal $n(k)$). Because col. 13, line 12, gives the cutoff frequency as 6 kHz, significant portions of the music signal $n(k)$ will still be present after filter 402. Hence, Neubauer et al. as applied fails to disclose at least isolating the modulated carrier signal from the audio signal as set forth in claims 7 and 18.

Also, col. 11, lines 46-50, of Neubauer et al. discloses that the bandwidth of the noise

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signal $g(l)$ output from block 106 is also 6 kHz. Hence, filter 402 also fails to isolate the modulated carrier signal (i.e., $s(l)$) from the masking signal (i.e., $g(l)$), because they are both present in the same, unfiltered 6kHz bandwidth. Thus, Neubauer et al. as applied fails to disclose at least filter[ing] the enhanced acoustic transmission signal to isolate the modulated carrier signal from both the masking signal and the audio signal, and the rejection of claims 7 and 18 is improper.

Further, FIR filter 408 does not demodulate the modulated carrier signal (i.e., $s(l)$ according to page 2 of the Office Action). Rather, FIR filter 408 produces a correlated response when its coefficients match the pseudo-noise (PN) sequence of generator 106 (see col. 13, lines 25-38). Nowhere does this portion or another portion of Neubauer et al. disclose filter 408 "demodulating" the modulated carrier signal to remove the data from the alleged carrier signal $\cos\omega t$. Thus, Neubauer et al. as applied also fails to disclose at least the claimed demodulating, and the rejection of claims 7 and 18 is improper and should be withdrawn.

Claims 8 and 19 are allowable at least by virtue of their dependence from claims 7 and 18.

Regarding the § 103 rejection of dependent claims 3, 6, 11, 14, 15, and 20, the addition of Boney et al. (claims 6, 14, 15, and 20) and Bassini et al. (claims 3 and 11), even if it were proper, fails to cure the deficiencies of Neubauer et al. noted above. No allegation or proof has been provided that Boney et al. and Bassini et al. teach or suggest the missing elements from claims 1, 7, 9, and 18 above. Thus, a *prima facie* case of obviousness has not been established for

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dependent claims 3, 6, 11, 14, 15, and 20, because the references as combined fail to teach or suggest all claimed elements.

New Claims 30-36:

New claims 30-33 each require a method including, *inter alia*, "removing a range of frequencies in an audio signal to produce a notched audio signal; and generating a data signal that falls in the range of frequencies and apart from the one portion." As explained above with regard to claims 1-20, Neubauer et al. fails to teach or suggest removing a range of frequencies from an audio signal. Music signal $n(k)$ is provided to adder 116 without modification, and the data signal 104 is provided in a spread-spectrum (as opposed to separate spectrum) manner (see col. 11, lines 45-62). Hence, Neubauer et al. fails to teach or suggest all elements of newly added claims 30-33.

New claims 34-36 each require a method including, *inter alia*, "separating the masking signal and the data signal in the frequency range from the audio information outside the frequency range." As explained with regard to claims 1-20, Neubauer et al. fails to teach or suggest separating information in one frequency range from audio information in another. In particular, low-pass filter 402 passes significant audio information in the 0-6 kHz range. Thus, Neubauer et al. fails to teach or suggest all elements of newly added claims 34-36.

Reconsideration and allowance of pending claims 1-20 and 30-36 are respectfully requested.

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In the event that any outstanding matters remain in this application, Applicant requests that the Examiner contact Alan Pedersen-Giles, attorney for Applicant, at the number below to discuss such matters.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-0221 and please credit any excess fees to such deposit account.

Respectfully submitted,

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